

Assignment 4 – Questions

Review Questions: R2 - R4, R11 - R13, R15, R17, R21, R23

Problems Questions: P8, P11, P17, P18

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Chapter 4 Review Questions

2. Datagram-based network layer: forwarding; routing. Additional function of VC-based network layer: call setup.

3. Forwarding is about moving a packet from a router's input link to the appropriate output link. Routing is about determining the end-to-routes between sources and destinations.

4. Yes, both use forwarding tables. For descriptions of the tables, see Section 4.2.

11. HOL blocking – a queued packet in an input queue must wait for transfer through the fabric because it is blocked by another packet at the head of the line. It occurs at the input port.

12. Yes. They have one address for each interface. (1.a.1)

13. 11011111 00000001 00000011 00011100 (1.b.2)

15. 8 interfaces (1.c.4); 3 forwarding tables (1.d.3)

17. The 8-bit protocol field in the IP datagram contains information about which transport layer protocol the destination host should pass the segment to.

21. Link state algorithms: Computes the least-cost path between source and destination using complete, global knowledge about the network. Distance-vector routing: The calculation of the least-cost path is carried out in an iterative, distributed manner. A node only knows the neighbor to which it should forward a packet in order to reach given destination along the least-cost path, and the cost of that path from itself to the destination.

23. No. Each AS has administrative autonomy for routing within an AS.

Chapter 4 Problems

Problem 8

a) (2.a.1)

Prefix Match	Link Interface
11100000	0
11100001 00000000	1
11100001	2
otherwise	3

- b) Prefix match for first address is 4th entry: link interface 3 (2.b.4)
Prefix match for second address is 2nd entry: link interface 1 (2.c.2)
Prefix match for first address is 3rd entry: link interface 2 (2.d.3)

Problem 11 (3.a)

223.1.17.0/25 223.1.17.128/26 223.1.17.192/26

Problem 17 (4.d)

MP3 file size = 4 million bytes. Assume the data is carried in TCP segments, with each TCP segment also having 20 bytes of header. Then each datagram can carry $1500-40=1460$ bytes of the MP3 file

Number of datagrams required = $\left\lceil \frac{4 \times 10^6}{1460} \right\rceil = 2740$. All but the last datagram will

be 1,500 bytes; the last datagram will be $1060+40 = 1100$ bytes. Note that here there is not fragmentation – the source host does not create datagrams larger than 1500 bytes, and these datagrams are smaller than the MTUs of the links.

Problem 18

a) Home addresses: 192.168.0.1, 192.168.0.2, 192.168.0.3 with the router interface being 192.168.0.4 (5.a.1)

b) (5.b.2)

NAT Translation Table	
WAN Side	LAN Side
128.119.40.86, 4000	192.168.0.1, 3345
128.119.40.86, 4001	192.168.0.1, 3346
128.119.40.86, 4002	192.168.0.2, 3445
128.119.40.86, 4003	192.168.0.2, 3446
128.119.40.86, 4004	192.168.0.3, 3545
128.119.40.86, 4005	192.168.0.3, 3546